AMENDMENTS TO THE CLAIMS:

The following listing of claims supersedes all prior versions and listings of claims

in this application:

LISTING OF CLAIMS:

1. (Currently Amended) An electronic control apparatus which incorporates a

floating-point arithmetic function and performs calculation and control operations in

accordance with a predetermined computer program, said apparatus comprising:

a computer;

a memory having stored therein map data that comprises a set of map points

expressed in floating-point representation and a set of map values respectively

corresponding to said map points and expressed in fixed-point representation;

means for outputting a calculated value of a physical quantity, derived from said

map data based on an inputted fixed-point representation value; and

conversion means implemented by executing a computer program on said

computer adapted to operate on said map data that comprise a set of map points and a set

of map values respectively corresponding to said map points, and to selectively convert at

least one of said set of map points and set of map values from fixed-point representation

to floating-point representation data, wherein:

said ~~at least one of said set of map points and~~ set of map values indirectly

represent respective values of [[a]] said physical quantity, and data expressing said set of

map values are of smaller amount than data which express said set of map points;

said conversion means comprises means for providing a LSB (least significant bit)

conversion value as a floating-point representation value which directly represents a

specific value of said physical quantity, with said specific physical quantity value having

been predetermined as corresponding to a LSB (least significant bit) of said ~~at least one~~

~~of the set of map points and~~ set of map values; and

said conversion means is adapted to ~~operate on~~ respond to said inputted floating-

point representation value by: ~~converted data with said LSB conversion value, to obtain a~~

~~floating-point representation calculated value of said physical quantity and to output said~~

~~calculated value~~

selecting a pair of map points that are respectively close to said inputted floating-

point representation value and that correspond to a specific pair of said map values, and

calculating an interpolation coefficient corresponding to said selected pair of map points,

converting said specific pair of map values to respective floating-point

representation values,

interpolating between said converted pair of map values by a floating-point

calculation utilizing said interpolation coefficient, to obtain an interpolated floating-point

value; and

operating on said interpolated floating-point value with said LSB conversion

value, for obtaining a value to be outputted as said calculated value of the physical

quantity derived from said map data.

2-6. Cancelled

7. (Currently Amended) An electronic control apparatus according to claim [[6]]

1 comprising means adapted to provide data expressing an offset value that has been

predetermined as corresponding to said set of map values [[data]], wherein said

interpolated floating-point value is obtained as a logical value, and wherein conversion

means is adapted to:

operate on said logical value with said LSB conversion value, to obtain a

provisional value of said calculated value of said physical quantity, and

add said offset value to said provisional value, to obtain said floating-point

representation calculated value of said physical quantity derived from said map data.

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8-9. Cancelled

10. (Previously Presented) An electronic control apparatus according to claim 1, further comprising:

means for providing ID (identifier) data which express a type of said fixed-point representation data,

wherein said conversion means performs conversion of said floating-point representation data to said fixed-point representation data based on said ID data.

11. (Original) An electronic control apparatus according to claim 1, wherein said conversion means executes said conversion by using a program that is written in assembler language.

12. (Previously Presented) An electronic control apparatus according to claim 1, comprising:

means for providing ID (identifier) data which have been predetermined as corresponding to said map data and which indicate whether or not both said map points and said map values of said map data are expressed in floating-point representation, and

means for inhibiting said conversion operation of said conversion means when said ID data indicate that both said map points and said map values are expressed in floating-point representation.

13. (Currently Amended) A memory apparatus <u>which functions with a computer</u> <u>in</u> [[for]] an electronic control apparatus, said electronic control apparatus executing <u>on</u> <u>said computer</u> calculation and control processing in accordance with a predetermined program and having a floating-point arithmetic function, and said memory apparatus having stored therein map data which are used in floating-point calculations <u>by said</u> <u>computer</u>, said memory apparatus comprising:

a digital store containing said map data including a set of map points and a set of map values that respectively correspond to said map points, with at least one of said set of map points and said set of map values being expressed by fixed-point representation data, and

means for ~~outputting~~ <u>functioning with said computer to output</u> a calculated value representing a physical quantity,

wherein said memory apparatus has stored therein, in conjunction with said map data, a LSB (least significant bit) conversion value that is expressed in floating-point

representation and represents a physical quantity value that has been predetermined as corresponding to a least significant bit of said fixed-point representation data.

14. (Previously Presented) A memory apparatus for an electronic control apparatus according to claim 13 wherein:

said memory apparatus has stored therein, in conjunction with said map data, an offset value that is a difference between a physical quantity value and a value that has been generated by converting said fixed-point representation data to floating-point representation data and using said LSB conversion value to operate on a result of a calculation performed on said converted floating-point representation data.

15. (Previously Presented) A memory apparatus for an electronic control apparatus according to claim 13, wherein:

said memory apparatus has stored therein, in conjunction with said map data, ID (identifier) data indicative of a type of said fixed-point representation data.

16. (Previously Presented) A memory apparatus for an electronic control apparatus according to claim 13, wherein:

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said memory apparatus has stored therein said map data with both said map points

and said map values being expressed by floating-point representation data and further has

stored therein, in conjunction with said map data, ID (identifier) data indicative of the

condition that said map points and map values are both expressed in floating-point

representation data.

17. (Currently Amended) An electronic control apparatus which incorporates a

floating-point arithmetic function and performs ~~various types of~~ calculation and control

operations in accordance with a predetermined computer program, said apparatus

comprising:

a memory having stored therein map data that comprise a set of map points that

are expressed in fixed-point representation and a set of map values respectively

corresponding to said map points and expressed in floating-point representation, [[and]]

means for outputting a calculated value <u>derived from said map data based on an</u>

<u>inputted floating-point representation value of</u> ~~representing~~ a physical quantity, <u>and</u>

<u>conversion means implemented by executing said computer program, adapted to</u>

<u>operate on said map data to convert said map points from fixed-point representation to</u>

<u>floating-point representation data,</u>

wherein:

said set of map points indirectly represent respective values of [[a]] <u>said</u>

<u>physical quantity, and data expressing said set of map points are of smaller amount than</u>

<u>data which express said set of map values</u>; [[and]]

said conversion means comprises means for providing a LSB (least

significant bit) conversion value expressed in floating-point representation, directly

representing a value of said physical quantity that has been predetermined as

corresponding to a LSB of said set of map points; and

said conversion means is adapted to <u>respond to said inputted</u> convert at

least one of said map points to floating-point representation <u>value by:</u> and to operate on

said floating-point representation converted map point with said LSB conversion value,

to obtain a calculated value of said physical quantity in floating-point representation

<u>converting said map pints to respective floating-point representation map points,</u>

<u>multiplying each of said floating-point representation map points by said LSB conversion</u>

<u>value to obtain respectively corresponding values of said first quantity, and selecting a</u>

<u>pair of said corresponding physical quantity values that are respectively close to said</u>

<u>inputted floating-point representation value and that correspond to a specific pair of said</u>

<u>map values,</u>

<u>calculating an interpolation coefficient corresponding to said selected pair of</u>

<u>physical quantity values, and</u>

interpolating between said specific pair of map values by a floating-point

calculation utilizing said interpolation coefficient, for obtaining a value to be outputted as

said calculated value derived from said map data.

18. (Currently Amended) An electronic control apparatus according to claim 17,

further comprising:

means for providing data expressing an offset value that has been predetermined

as corresponding to said set of map points [[data]],

wherein said conversion means obtains said interpolated value as a logical value,

and wherein said conversion means is adapted to:

multiply said interpolated value by said LSB conversion value, to obtain a

provisional value of said calculated physical quantity; and

add said offset value to said provisional value, to obtain said floating-point

representation calculated value of said physical quantity.

obtain respective provisional values of said first physical quantity by multiplying

said map points by said LSB conversion value, and to obtain said respectively

corresponding values of the first physical quantity by adding said offset value to each of

said provisional values.